

NASA Success Story

Electronic Tankless Water Heater



Space, Energy, Time Savings (S.E.T.S.) Systems, Inc. is a Miami, Florida-based manufacturer of electronic tankless water heaters that are designed to replace hot water tanks in any location. Computer chip technology is used to control the heating of the water through heating elements, providing hot water on demand, instead of storing it in the traditional hot water tank. Although tankless water heaters have been used in Europe and Asia for years, these systems do not supply an entire home at once. The S.E.T.S. heater unit was built to efficiently serve the entire home and never run out of hot water. S.E.T.S. devised the heater to keep manufacturing costs to a minimum, while retaining high quality for the consumer. However, the whole house design had a problem: the flow switch suffered intermittent problems. The switch, activated by a reed switch, tended to get stuck, sometimes causing the safety thermostats to disconnect the electrical current to the unit. After hiring several testing and engineering firms to help solve the problem, S.E.T.S. still had no solution. Then the company heard about the NASA-KSC/State of Florida Technology Outreach Program, which ran a NASA network throughout Florida to provide technical assistance to businesses at no cost. The Technology Programs and Commercialization Office at Kennedy Space Center supplied S.E.T.S. with an engineer with expertise in flowmeters, who solved the flow switch problem with a modest, but working redesign. A prototype heater flow switch was then built. Extensive testing of the new assembly worked flawlessly. Older heaters could be fixed by replacing two parts in the flow switch without removing the heater.

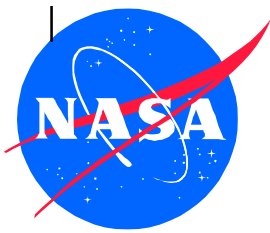
NASA Involvement KSC's Technology Programs and Commercialization Office heard about the water heater manufacturer's problems through its Technology Outreach Program, sponsored jointly by the State of Florida and NASA. The Miami company learned of the program, which provided technical service to businesses, through its local Chamber of Commerce. The program applies scientific and engineering expertise originally developed for space applications to the Florida business community. KSC arranged a Technology Transfer Agreement (TTA) with S.E.T.S. and

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assigned an engineer to tackle the flow switch problem. The KSC engineer contacted the company and requested samples of the flow switch for examination. S.E.T.S. sent him an entire heater unit. After studying the unit, the engineer discovered there were two problems with the heater's flow switch, both to do with a plastic element inside the pipe. Redesigning the flow switch solved the problems.

Social/Economic Benefit The assistance NASA provided helped to minimize manufacturing costs, and therefore, saved S.E.T.S. money during development. The cost of the old flow switch was \$3 to \$4 each; the redesigned unit costs about 60 cents each. The new design allows the unit to work flawlessly and the system has modernized the way we heat water. In addition to sales in Latin America, the company is now prominent in U.S. markets, with the heater being marketed by one of the largest electric power companies in this country (FirstEnergy Corp. of Ohio) under private label, and is currently selling units to major business chains in the U.S. The S.E.T.S. unit has also been selected to replace all existing tank water heaters at one of the country's largest time share resorts (Bonaventure Resorts) in Florida. The tankless water heater offers the consumer many economic and personal benefits. Not needing a hot water tank can generate up to 50-percent savings of heating bills. Space savings are also important; the unit is about the size of a phone book. Installation costs are reduced since the units need no pressure relief valve like conventional storage tanks. Because the heater uses electricity, there is no need for venting as with propane or natural gas units. S.E.T.S. Systems currently seeks distributors worldwide. Also, a revolutionary new swimming pool heater has been developed by S.E.T.S. that uses the same flow switch technology. This product is now available to benefit all pool owners.

Industry Partner

S.E.T.S. Systems, Inc.

NASA Partner

Kennedy Space Center
Southeast Regional Technology Transfer Center

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